REMARKS

This amendment is filed in response to the final Office Action dated April 5, 2007. In that Action, the Examiner rejected Claims 1, 2, 5, 6, 8-10, 12, 14, 15-18, 27, 28, 31, 32, 34-36, 39, 41-45, 54, 58 and 60-62 under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of Kita. Claim 37 was rejected under §103(a) as being unpatentable over Johnson in view of Kita and Schleifstein. Claims 3, 7, 19-22, 29, 33 and 46-49 were rejected under §103(a) as being unpatentable over Johnson in view of Kita and Smith. Claims 13, 40, 54-57 and 59 were rejected under §103(a) as being unpatentable over Johnson in view of Monette.

Applicant would note for the record that on March 7, 2007, he requested in writing a further interview to discuss the latest rejections but the Examiner refused to meet with him. Applicant still desires to have that interview and is resubmitting the interview request.

Regarding the article that was previously submitted, "Optimal Control of Multiphoton Ionization Processes in Aligned I2 Molecules with Time-Dependent Polarization Pulses," Applicant would repeat that this document was not submitted as prior art but rather was submitted for informative purposes to elucidate the Examiner regarding the differences between polarization and nuclear resonance. The Examiner's refusal to review the article for educational purposes merely reinforces the perception that the Examiner is not willing to thoughtfully study the scientific details relating to this application.

With regard to the §103(a) rejection based on Johnson in view of Kita, Applicant has noted in his previous response that Kita has nothing to do with nuclear resonant stimulation and there is no indication from either Kita or Johnson how the magnetic field source or microprocessor of Kita would be modified to carry out NMR or NQR. Kita only adjusts the magnetic field intensity (flux) and not any frequency, so the proposed combination of Johnson and Kita still fails to result in any adjustment which would affect a nuclear resonant stimulation source. Claims 1, 27 and 54 refer to adjustment of the "frequency of the nuclear resonance stimulation." Kita states that the "function of the microprocessor is … supplying the electromagnet with a proper level of electrical power," and that "the microprocessor increases the electrical power supplied to the electromagnetic device" (column 4, line 59 through column

5, line 3). The Office Action fails to explain why one skilled in the art would be motivated to adjust frequency (for nuclear resonant stimulation) based on prior art that only adjusts intensity (for polarization). In spite of Applicant's numerous attempts to request the Examiner address the issue, the Office Action completely avoids this critical distinction. The characterization of Kita at page 4 last paragraph through page 5 first paragraph of the Office Action never mentions the "frequency" of a nuclear resonance stimulation being adjusted. The Office Action concedes that Johnson does not teach the adjustment of the frequency, and the text at column 1, lines 54-56 of Johnson does not say anything about "varying" the frequency. The proposed combination of Johnson and Kita would thus result only in the Johnson device having an ability to adjust magnetic field intensity, and not frequency as claimed by Applicant. As stated in *In re Kumar*, 418 F.3d 1361, 1369 (Fed. Cir. 2005), "To render a later invention unpatentable for obviousness, the prior art must enable a person of ordinary skill in the field to make and use the later invention." The proposed combination of Johnson and Kita does not *enable* Applicant's invention.

With further regard to Claims 15-18 and 42-45, Applicant incorporates the arguments from the previous response, to the effect that Johnson never teaches an activation time of 1 second or less before combustion such that the travel time is less than a resonance relaxation time of a stimulated component. Johnson states that the excitation occurs in the carburetor which is too far removed from the combustion location.

With regard to the §103(a) rejections based on Johnson in view of Monette, Applicant would reiterate that Monette fails to teach the adjustment of a nuclear resonance stimulation source. As with Kita, Monette says nothing about nuclear resonance (NMR or NQR). Monette's physical mechanism is polarization of the combustion materials, which is a completely different phenomenon from nuclear resonance. Polarization flips and oscillates the entire atom or molecule, but NMR and NQR do not flip the atom or even flip the nucleus. The nuclei in NMR/NQR are perturbed but not rotated 180 degrees, and the resulting nuclear motion is not oscillation but is precession (wobble). These differences in the physical mechanisms are crucial as they relate to how the instrumentation must be implemented.

Claim 13 depends from Claim 1, Claim 40 depends from Claim 27, and Claims 55-57 and 59 depend from Claim 54; Claims 1, 27 and 54 explicitly recite "nuclear resonance

stimulation" and the adjustment of the "frequency of the nuclear resonance stimulation." The Office Action incorrectly states that the Monette magnetic field "is capable of" stimulating the nucleus of an atom to nuclear resonance. The polarizing effect of Monette (and Kita) is not subatomic. The article that was sent with Applicant's previous response was intended as a reference source to help the Examiner better understand this distinction. The two opposing signals generated by the Monette device and emitted from two wires (reference numerals 8 and 9 of Monette) will not produce nuclear resonance. There is no targeting of any specific atoms but rather just a broad-brush attempt to polarize anything in the fuel line. If the Examiner feels Monette can carry out nuclear resonant stimulation, then Applicant would ask how exactly, e.g., NMR or NQR? There is no further explanation in this regard in the Office Action. The output signals of the Monette device do not fit with any definition of nuclear resonance. As stated in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___ (2007), quoting from *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." The Office Action lacks the explicit analysis required by *KSR*.

Moreover, the standard is not whether a prior art device is "capable of" achieving a particular result, and the question is not whether the device of Monette could be modified for use in NMR or NQR; instead, the question is what does Monette teach? One skilled in the art would not understand Monette to be applicable to nuclear resonant stimulation. There is nothing in either Johnson or Monette that would motivate one skilled in the art to apply Monette to nuclear resonant stimulation, and there is certainly no guidance on how it would be so applied. One skilled in the art simply would not think of taking the polarization technique of Monette and modifying it for nuclear resonance since the two techniques are fundamentally different. The differences between the techniques are also apparent from the lack of any electromagnetic pulse in either Kita or Monette. Claims 10, 17, 21, 36, 44 and 48 all recite synchronization of an electromagnetic pulse with the combustion reaction. In short, any ostensible feedback in Kita or Monette is based on a different science, performed in a different manner than claimed by Applicant, and is directed to a different result—polarization not nuclear resonance.

Furthermore, Monette does not provide any feedback adjustment of the frequency based on temperature in an exhaust stream. The Office Action incorrectly states that variations in the ambient temperature "obviously relate" to variations in the exhaust stream. This statement is conclusary and without scientific basis, and it is easily refuted by sticking a finger in an exhaust pipe of a car—whether the ambient temperature is hot or cold, the car exhaust is always extremely hot. Feedback based on the temperature of an exhaust stream is simply not equivalent to feedback based on ambient temperature. Any correlation between exhaust temperature and ambient temperature is insignificant. It is not always desirable to have higher temperature combustion as there is a trade-off between combustion efficiency and undesirable gases such as nitrous oxides.

With further regard to Claims 61 and 62, the Office Action concedes that Johnson does not disclose simultaneous multiple nuclear resonance stimulation, and refers to "duplication of parts." These claims do not involve mere duplication of parts and the effect is not simple amplification; rather, the claims recite two different frequencies (first and second) which are targeted for different selected components (first and second). Duplication of parts in this context would simply mean providing two stimulation sources for the same frequency. There is nothing in any prior art of record that discloses or suggests the simultaneous, multiple nuclear resonance stimulation of different selected components of a combustion reaction.

Notwithstanding the foregoing, Applicant has amended Claims 1, 27 and 54 to clarify the active nature of the feedback loop in the present invention, by referring to "iteratively" sensing the operating parameters, and "automatically" adjusting the frequency "in real-time" based on the parameters. The automatic nature of the present invention is described extensively in Applicant's specification for example at page 11, lines 8-16, which note that the controller adjusts the frequency responsive to signals from the feedback unit. The automatic nature of the present invention is also contrasted with manual adjustment at page 13, lines 24-25, and at page 14, lines 22-24. The iterative checking of the feedback parameters is described at page 12, lines 19-26. The real-time adjustment of the frequency is mentioned at page 13, lines 18-19. The claims thus more closely comport with Applicant's description of a real-time, active (closed loop) software feedback control system for the purpose of dynamic and multiple operational input adjustments. These amendments accordingly further distinguish the present invention from

the cited art. Neither Kita nor Monette provide any sort of real-time feedback for NMR or NQR control.

Although these amendments are being made after a final rejection, Applicant would respectfully request that they be entered since they present the rejected claims in better form for consideration on appeal, pursuant to Rule 116(b).

Applicant has made a diligent effort to advance the prosecution of this application by amending claims and by pointing out with specificity how the claims as presented patentably define the invention over the prior art of record. In view of the remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned.

Respectfully submitted,

/Jack V. Musgrove/

Jack V. Musgrove
Attorney for Applicant
Reg. No. 31,986
Telephone: 512-689-6116